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Epidemiology of Foot-and-Mouth Disease Outbreaks in the SEACFMD Region

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Background and Objective

Foot and Mouth Disease (FMD) is one of the most economically significant transboundary animal diseases, posing a major threat to cloven-hoofed livestock. Despite decades of control efforts, the disease remains endemic across much of Southeast Asia, where recurring outbreaks continue to undermine livestock production and trade. In response, the SEACFMD Campaign, coordinated by the World Organisation for Animal Health (WOAH) in collaboration with regional partners, has been working toward the eradication of FMD through strengthened surveillance, mass vaccination, and cross-border cooperation. This study provides an overview of the epidemiological situation of FMD in Southeast Asia, with particular emphasis on outbreak patterns, virus strain distribution, cross-border transmission risks, and the progress of regional control initiatives.

Methods

Data Sources

- **Outbreak data**: Monthly FMD outbreak reports from WAHIS.
- **Virus strain data**: Laboratory-confirmed FMDV lineages from regional reference labs.

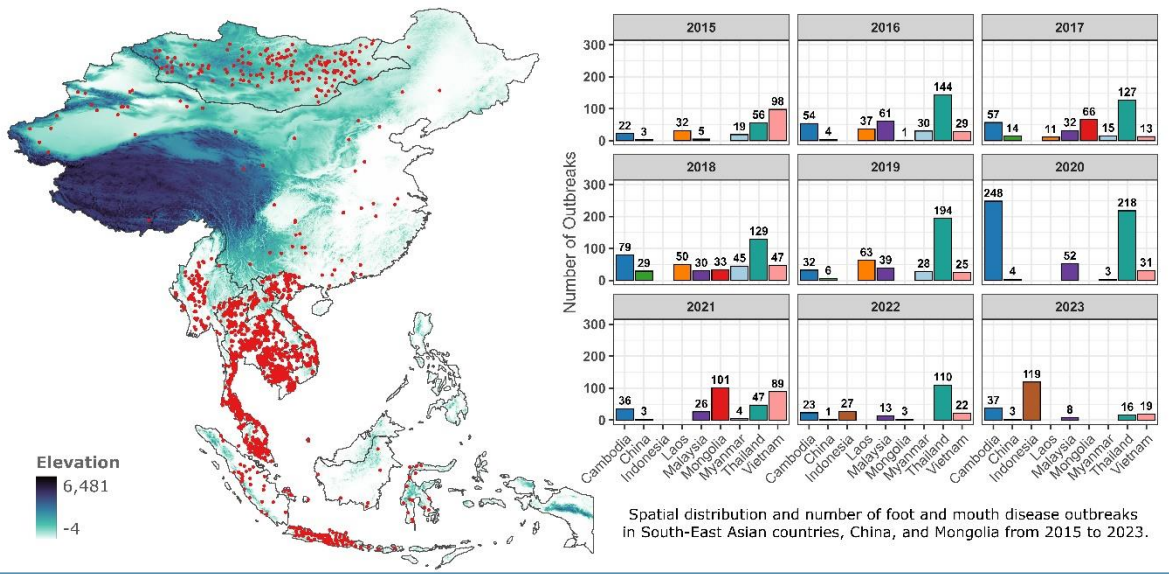
Analytical Approach

- Descriptive analysis of outbreak occurrence by location and time.
- Summarize molecular FMD virus (FMDV) data to identify dominant strains and distribution patterns.
- A space-time cluster analysis to detect statistically significant clusters of FMD outbreaks.

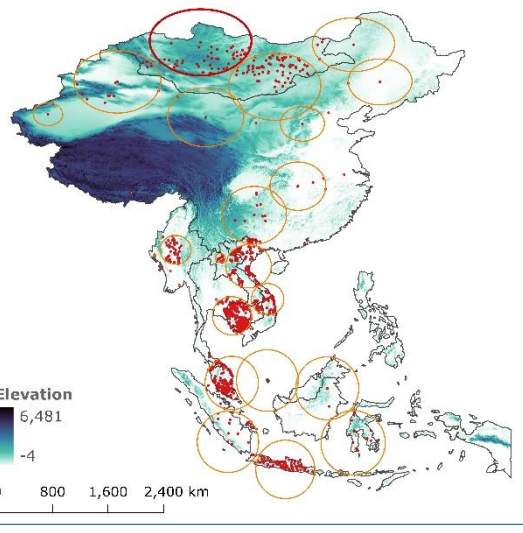
Results

Wide Geographic Distribution

FMD outbreaks occurred in multiple SEACFMD member countries, with concentrations in border areas and major livestock trade corridors.



Spatial distribution and number of foot and mouth disease outbreaks in South-East Asian countries, China, and Mongolia from 2015 to 2023.



Space-time Cluster Analysis

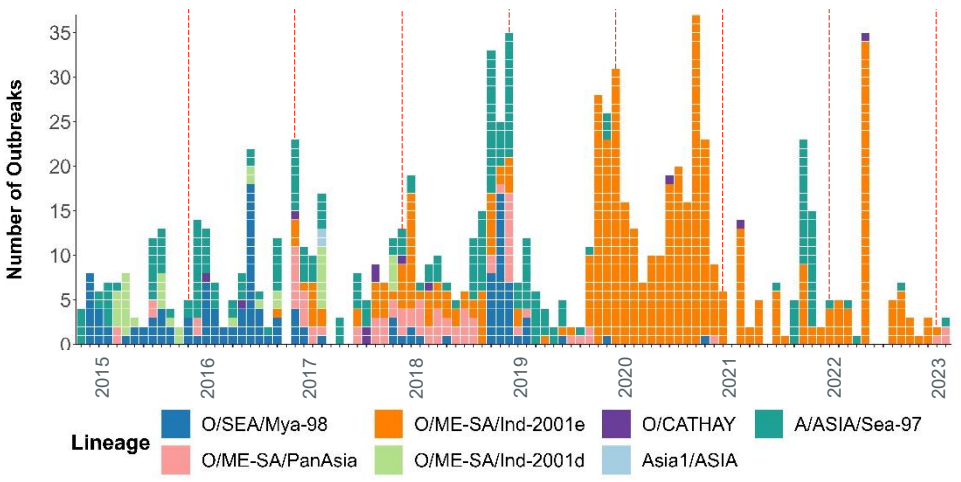
- The majority of FMD outbreak clusters (area in a circle) were confined to in-country transmission settings, with additional clusters spanning transboundary areas.
- Spatio-temporal outbreak cluster locations spanned international boundaries, supporting evidence of cross-border transmission.

The SEACFMD Campaign

The SEACFMD Campaign, coordinated by WOAH, provides a regional platform for harmonized FMD control, aligning national programs under a shared eradication roadmap.

Dominant FMDV Strain

- O/ME-SA/Ind-2001e was the most prevalent strain, detected in the majority of cluster locations.
- Other lineages were also detected such as A/ASIA/Sea-97 and O/ME-SA/PanAsia-2.



Discussion

The persistent endemicity of FMD across multiple countries in Southeast Asia demonstrated the complex challenges involved in achieving effective disease control. The current dominance of the O/ME-SA/Ind-2001e lineage emphasizes the urgent need for strain-matched vaccines and harmonized immunization schedules across the region. Moreover, cross-border animal movement continues to play a pivotal role in the spread of the disease, emphasizing the importance of establishing bilateral and multilateral agreements to regulate movement and ensure real-time information sharing. Moving forward, strengthening community engagement in border areas, improving biosecurity at livestock markets and checkpoints, and enhancing movement traceability represent critical steps toward more sustainable FMD control in Southeast Asia.

Take-home message

FMD remains widely distributed in the SEACFMD region, with a single dominant strain driving most outbreaks. Cross-border animal movement is a major driver of transmission, making regional cooperation under SEACFMD essential for eradication.